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ABSTRACT

The concept of deprivation has become very appealing to specialists of many disciplines as an explanation for deviations in human development. This is understandable, since the phenomenon does seem to be a key factor in development, but several technical and methodological considerations hinder immediate efforts at understanding and alleviating it. Ambiguities in definitions of the concept of deprivation and the necessity to rely on field study research designs constitute major deterrents to the acquisition of definitive data. To determine more clearly the effects of psychosocial deprivation on human development there have to be improved techniques for assessing the psychosocial environment and for standardizing change-sensitive measures of early development. Also, more attention needs to be given to clarifying the relationship between constitutional factors and susceptibility to deprivation. The single case model deserves more use in attempts to demonstrate the effects of the operation and removal of psychosocial deprivation. Finally, psychosocial enrichment might have an optimum level which should be taken into consideration. (Author/MH)

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THE EFFECTS OF PSYCHOSOCIAL DEPRIVATION ON HUMAN DEVELOPMENT IN INFANCY

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As an explanation for certain distortions in human development, the concept of deprivation has been very appealing to scientists from diverse backgrounds and with varied areas of application. Whenever any approximation of a minimal level of necessary input can be established, the deprivation model appears to be appropriate as a frame of reference; furthermore, it appears to be relevant for all living organisms and to the entire gamut of developmental influences from biochemical to psychosocial. Also, it seems to carry within it the promise of remediation, for if one can specify the substance of which the organism has been deprived, then one should hopefully be able to supply the missing ingredients in the proper quantities at the correct time.

The natural logic inherent in the concept of deprivation--i.e., that an insufficiency of a particular substance or experience would lead to untoward developmental consequences--has stimulated a vast amount of fruitful research. It is probably accurate to say that in general the sequential investigations have followed something of an evolutionary pattern in terms of choice of the dependent variable. The first of these is usually life itself, with sublethal effects gradually added to the list of possible consequences in an order that progresses from somatic toward psychosocial. Thus historically in terms of the consequences of nutritional deprivation, early studies tended to stress the effects of malnutrition on stature or brain weight, with research into its effects on mental development very current and that concerned with socio-emotional development more contemplated

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than consummated. Something of a similar evolution has occurred on the side of the independent variable. That is, early efforts were devoted primarily to demonstrations of the consequences of deprivation of some biochemical substance (e.g., oxygen) with research attention to psychosocial deprivation on a large scale being of fairly recent origin.

Within this broad domain of scientific concern with the consequences of deprivation, it is possible to offer some generalizations about findings that have emerged. When the investigations have utilized an experimental model, as is the case in animal studies where the independent variable can be precisely quantified and manipulated, findings have tended to be fairly consistent across a broad range of developmental influences. However, when hypotheses are tested in humans, forcing reliance upon a field study model with the hope of finding different levels of the independent variable in nature, consistency disappears and polemics materialize. In field studies the complexity of the concept of deprivation immediately becomes apparent. Not only is it difficult to disentangle one type of deprivation from another (e.g., nutritional and psychosocial), but to be precise about the time of maximum exertion of effect of one or another component is almost impossible. That is, prenatal malnutrition tends to be correlated with postnatal malnutrition and also with prenatal and postnatal psychosocial deprivation; in field studies it is virtually impossible to determine which is associated with any observed primary effect.'

When one uses psychosocial factors as both independent and dependent variables in a deprivation model design, it becomes increasingly difficult to arrive at any firm generalizations. Animal studies have not yielded completely consistent data either within or across species, as discussed by

Griffin and Harlow (1966). And at the human level, with the inevitable forfeiture of the experimental method, data have been both scanty and conflicting.

Some of the variance may relate to the difficulty involved in precisely defining what it is we are talking about when we speak of "psychosocial deprivation." Although an overly pedantic attempt at definition would be both unnecessary and tedious, it would perhaps help the discussion to follow if some attention were given to current thinking about the concept of psychosocial deprivation. Undoubtedly the most serious attempt at definition has been made by Richardson (1966), who discusses the slipperiness of the concept as follows:

"Two kinds of evidence can lead us to suspect deprivation. The first is whether the child is able to perform at a given age within the level of expectations and demands that are common to his tribe, society, or national group.

"The second kind of evidence needed to judge a case of deprivation involves the child's upbringing and experiences. . . If a child does not receive the elements of upbringing or experience essential for development, this is evidence of deprivation.

"These two kinds of evidence--of whether a child fails to live up to expectations and of whether he has not had the experiences necessary to prepare him to meet these expectations--are both needed to make a judgement (1966, pp. 55-56)."

Richardson is describing the kind of inference that is always required whenever information about a particular variable is sought after the fact--in this case, after the deprivation has presumably occurred. However, such a definition would not be necessary for a contemporary assessment of

deprivation with follow-up sustained long enough to permit the effects of the independently defined deprivation to appear. Unfortunately investigations of the consequences of psychosocial deprivation are often begun retrospectively. And yet contemporaneous assessments of children in potentially depriving environments should be a major research strategy. If one adhered rigidly to the Richardson concept of deprivation such investigations would be precluded.

In addition to the tendency to become alert to deprivation only after its presumed consequences have begun to appear, there is undoubtedly another reason for the tendency to want to support presumed presence of deprivation with proof of effect. Conceptually we are always troubled by false negatives, in this case by the appearance of some children who appear to develop reasonably well in an environment judged to be depriving in terms of a crucial component--children who grow big and strong on an inadequate diet, who grow up bright and alert after a history of having been blue and almost lifeless for five minutes following birth, who develop high achievement motivation in a sociocultural context characterized by apathy and defeat. An immediate and possibly valid explanation likely to be offered is that the crucial variable may not hit all children with the same impact; i.e., some children in a family get more food than others, or perhaps the anoxic baby had oxygen reserves that could not be measured, or perhaps the last child had a special relationship with a powerful non-family member. Thus it could be asserted that it is safer to infer deprivation only when one sees evidence that it has hit its target. This author regards such concern for cushioning the concept as unnecessary. During the middle ages it is doubtful that the occurrence of a plague was questioned just because half the population managed to live. The fact that deprivation defined in terms of a complex set of elements of experience needed for

development exists but occasionally misses its target does not require proof of effect for presence of influence to be inferred. Such a requirement runs the risk of purporting to study the effects of an independent variable (deprivation) on a dependent variable (development) by getting information about the magnitude of the independent variable from the measure of the dependent variable. Developmental misses are informative about the range of human adaptability; they do not require any more conceptual elasticizing for psychosocial factors than for any other type of presumed developmental influence. As we learn to identify more of "the elements of . . . experience essential for development," to determine whether they are critical only in the presence or absence of other variables or only if the phenomenological field and the objective field are isomorphic, it will become easier to refine the definition of deprivation and thus engage in anterospective studies of development in which psychosocial deprivation might occur.

Evolution of Present Knowledge in the Field

With respect to the effects of psychosocial deprivation on the human infant, there has unfortunately been more speculation than investigation, or perhaps less speculation than unwarranted inference. Research with this age group is extremely difficult to conduct, not only because of the above described tangles inherent in the deprivation concept but also because of a shortage of assessment techniques suited to the young child and of qualified persons to apply them. Nor has there ever been a readily available series of large numbers of potential research subjects--at least not readily available to persons interested in this area. The well-child clinic has

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been the only major resource, and by and large it has not been utilized for such studies. And, as now constituted in most communities, it would produce a biased sample.

Much of the early work done in the area owes its impetus to the reports of Spitz (1945, 1946), who launched what might be called the 'maternal deprivation' decade. His report that infants who were abruptly separated from their mothers often went into a state of depression and showed a sharp decline in cognitive functioning seemed to catalyze world-wide interest in the subject. Implicit in this work was the importance of the emotional relationship existing between mother and infant. The publication of Bowlby's monograph (1952) summarizing the existing world literature on the subject, while still concentrating on the maternal component of the deprivation, made concern with the psychosocial environment during infancy official and instigated very salutary international changes in institutional practices. Historians can always recognize precursors to an idea whose time has come, and Stone (1954) pointed out that curiosity about the consequences of what is here being called psychosocial deprivation is very old indeed. In fact, just prior to the time Spitz published his first report, Bibble (1943) had been stressing the importance of the mother for the healthy development of the infant. However, she appeared to be placing greater emphasis on the physical stimulation provided by the monther and thereby missed her chance to parent a trend.

It did not take long until disclaimers appeared, occasionally caustic and polemic (e.g., Pinneau, 1951, 1955), but more often simply as suggestions that proponents of the maternal deprivation concept might be overstating things in their insinuation that negative consequences were inevitable and

irreversible. As the exciting animal work of the mid-fifties and early sixties came to be known, perhaps especially the work of Harlow and his associates (1958, 1961), the adjective in "maternal deprivation" began to be downgraded and more attention paid to the noun. Casler, for example, published a monograph (Casler, 1961) in which he almost superciliously ridiculed the notion that the "maternal" part of the concept was important for anything other than the sensory stimulation supplied thereby.

The coup de grace to the indiscriminate espousal of the concept of maternal deprivation was supplied not by polemics but by careful analyses of empirical studies (see especially Yarrow, 1961, 1964; and Ainsworth, 1962) which challenged the notions of inevitability and irreversibility of effect and which pointed out some of the common design flaws inherent in most of the available studies. From these analyses, from other empirical work appearing at the time, and from new social concerns which suddenly galvanized in the early sixties, the concept of maternal deprivation as an independent variable was broadened to take in the entire psycho-social-cultural domain. Again, as is customarily the pattern in the early stages of evolution of an idea, there was a tendency to indict an entire package rather than look immediately for those aspects which were most crucial. Thus Riessman's book (Riessman, 1962) launched a new term--cultural deprivation--and the types of studies which followed seemed almost unconcerned with anything as specific and personal as a young child's relationship with his mother. The suspected irritants were much more social and cosmic! At the same time, developmental concerns (the dependent variable side of the paradigm) seemed to shift from socioemotional to cognitive. The publication of Intelligence and Experience

by Hunt (1961), organizing a wealth of evidence relating to the effects of experience on intelligence, and, by implication, of deprivation of crucial components of experience, seemed to help shift interest from any narrow selection of influences to an examination of a full array of experiential parameters.

In this brief history here traced, it was interesting to note how quickly the infant got lost. Not the importance of infancy, by any means; just the infant. In fact, he seemed to disappear between Spitz and Bowlby! For while Spitz's work had dealt with infants whom he had observed both prior to and after separation from the mother, most of the studies found by Bowlby and referred to in his volume were retrospective and involved later reports of persons who had been separated from their mothers during infancy. Bowlby, Ainsworth, and Rosenbluth (1956) later carried out a follow-up study using children who had been separated from their mothers during infancy, but the assessments were carried out during the middle childhood period. And yet most of the available literature on maternal deprivation seemed to suggest that the critical period for producing maximum separation effects was during infancy.

In another vein, studies which began to appear in the early sixties contrasting the developmental picture of children who were culturally deprived (to use the term then fashionable) and non-deprived groups tended to show that by the time the children reached public school age they already functioned at a lower level than their non-deprived peers. This could only be interpreted as indicating that the depressing effect of the environment had already been at work during the early years of life, even though the research groups had not studied their subjects during that period.

Field studies of early deprivation

Some of the early leads regarding psychosocial deprivation during infancy came from studies concerned with effects of different child-rearing practices, with information occasionally offering misleads rather than heuristic clues. In an early study of child-rearing practices in different ethnic and social class groups, Davis and Havighurst (1946) suggested that the early family environment of the lower class child was perhaps more comfortable, in terms of parental practices, than that of the middle class child. Lower class parents reported themselves, in interviews, to be more indulgent in terms of early feeding practices and to be less concerned with early toilet training than did middle class parents. Also they were interpreted as being more willing to grant independence as their children grew older. Class differences were more striking than race differences. Williams and Scott (1953), using only Negro families, found essentially the same pattern of class differences.

Less than a decade later, however, data from the study of Maccoby and Gibbs (1954) suggested just the reverse pattern. That is, maternal interviews with parents of five-year-olds brought forth the information that, during infancy as well as at the time of the interviews, the middle class parents were more lenient and permissive than the lower class parents. A number of independent researches subsequently carried out tended, in general, to support the findings of the Maccoby and Gibbs study or else to find no appreciable differences between social class groups (see Caldwell, 1964). Bronfenbrenner (1958) suggested that the tenor of the postwar period was in favor of permissiveness and that middle class parents,

with their greater susceptibility to opinions of the "experts," had probably assimilated the recommendations more rapidly than lower class parents. At any rate, certainly no data have emerged since the early fifties to suggest that in any significant way the child from what might be considered deprived social circumstances has any particular psychological advantage in his early family environment.

Most of these studies used as contrast groups samples that perhaps did not differ very drastically along a hypothetical continuum from deprived to nondeprived. For example, in the Maccoby and Gibbs (1954) study, the groups might be described as upper-lower versus lower-middle. In more recent years, however, careful studies of groups that could be characterized as truly deprived have been carried out, most notable of which are perhaps Wortis et al. (1963), Pavenstedt (1965), and Malone (1966). In Wortis et al. study, observations were carried out during infancy, making this perhaps the most relevant study for the present discussion. They found that what might have been called permissiveness in another decade appeared to be more a lack of concern. Weaning and toilet training, rather than being carried out slowly and in line with the child's indications of maturity, were handled inconsistently and in the manner that caused the least trouble for the mother. These mothers were extremely intolerant of any experssions of aggression from the children but were relatively unconcerned about manners, noise, and cleanliness in general. Also the mothers themselves were depressed and withdrawn and in general pessimistic about life. Independently assayed, i.e., not judged on the basis of development of the children, psychosocial deprivation was a demonstrable reality. Here it should be mentioned parenthetically

that all the children in this study had been born prematurely, thus compounding biological insult with psychosocial deprivation. The children involved in this study, now in the middle childhood years, are currently being followed to learn about their school achievement and general social and emotional adjustment (Wortis, personal communication).

Caldwell and Richmond (1967) have reported on a small sample of low-income mothers whose maternal behavior was observed and rated sequentially and whose children were examined at the same points in time. These data offer leads regarding the relation between certain discrete maternal behaviors that would be considered depriving and the development of the children during the infancy period. The results showed that, on a number of scales purporting to measure some aspect of affiliative (emotionally supportive) maternal behavior, mothers who were rated lowest on these scales had children with lower IQ's at 12, 18, and 24 months of age. Similar associations were found for a series of scales measuring different facets of achievement motivation in the mothers. In general the correlations between affiliative and achievement oriented maternal behavior and development at 12 months of age tended to be low and positive, with both the number of coefficients attaining statistical significance and their magnitude increasing as the children approached two years of age.

With the intensified interest in cognitive development in the sixties has come a renewed interest in instrument development for the early infancy period. This interest, coupled with concern for psychosocially deprived children, has led to a number of new studies examining early differences between infants being reared in suspect environments and those being reared

in environments labeled by fiat as adequate (i.e., middle class homes). Two recent studies have produced somewhat contradictory results. Wachs (1967) found social class differences as early as 12 months on an ordinal scale developed by Uzgiris and Hunt (1964) which measures attainment of the concept object permanence. On the other hand, Golden and Birns (1968) were unable to demonstrate social class differences in test scores of Negro infants during the first two years of life on either a standard test of infant development (the Cattell) or an experimental procedure developed to measure more subtle aspects of cognitive functioning. They did, however, report that the children from lower social class groups were more difficult to test, with one-fourth of the children from welfare families requiring more than one session to complete the testing. This finding, whether due to motivational factors or to difficulty in adjusting to the interpersonal components of the test, somewhat weakened the authors' conclusions of no social class differences in performance.

A most interesting and important study by Decarie (1965), although carried out in quite a different context, has yielded important data relating to the effects of psychosocial deprivation during infancy. She was concerned with determining whether the Piagetian concept of "object permanence" bore a relation to the psychoanalytic concept of "object relations," developing an experimental procedure to measure the former and adapting certain items from the Griffiths Scale of Mental Development (1953) to measure the latter. For her population she used 30 home-reared infants, 30 in adoptive homes, and 30 residing in an institution. Her results showed clearly the damaging effects of the psychosocial deprivation inherent in the institutional atmosphere, as on both the measures of object permanence and

object relations the institutional infants (examined repeatedly up to 22 months of age) lagged behind the other two groups, showed deviant as well as developmental profiles, and were far more variable than the other two groups. Significantly, the children in adoptive homes, all of whom had undergone at least one separation and relocation, generally occupied an intermediate position between the institution and home reared infant.

The important question of what happens developmentally during the period between roughly the end of the first year and age three, at which time at least a few children come under research scrutiny, remains a research problem of top priority. Early studies (again often done outside the deprivation model but offering data relevant to inferences in this area) tended to show no major differences between infants presumed to be non-deprived and a group that might be considered deprived of one or more developmental supports. For example, Knobloch and Pasamanick (1953) showed that Negro infants were slightly accelerated in motor development during the first year of life and certainly showed no major deficit in functioning during this period. Yet data coming from various compensatory education programs (see Hodges and Spicker, 1967) dealing with deprived and non-deprived preschool children, have consistently shown a deficit in functioning levels in the deprived groups during the preschool or kindergarten period. Deutsch has suggested (1965) that, rather than diminishing when the children reach the age of formal

public education, the discrepancy increases with age.

All the available studies are consistent in their implications. During the first year of life infants from deprived and non-deprived homes appear to develop at about the same rate; we tend to lose track of them from roughly one to three years of age; when found again at age three the deficit is striking (and depressingly resistant to sustained change). Such findings suggest that the optimal time for trying to reverse the deprivation is during the two year hiatus when subjects are seldom visible to research scrutiny. The programs described by Caldwell and Richardson (1963) Robinson (1968) and Gordon (1967) have been designed to try to develop intervention strategies appropriate for this crucial period.

Undoubtedly the most significant recent addition to information in this area is that provided by Bayley (1965). With carefully trained examiners giving the revised Bayley Scales of Mental and Motor Development to 1,409 infants from a representative sample of the total American population, she has established performance curves for relevant subgroups of infants between one and fifteen months of age. There were no significant differences in the mental scales as a function of social class, sex, race, or parental education up to 15 months of age. However, on the motor scales Negro infants tended to score higher than whites, with the differences significant at most evaluation points up to 12 months of age but not thereafter. The drop that occurs for the children from lower social class

backgrounds thus can be pinpointed as occurring somewhere between 15 months and three years of age. Similar data had been reported earlier by Hindley (1960) for a small group of British children within the age range of six to eighteen months.

Experimental studies relevant to the deprivation model

With human subjects, one cannot point to a truly experimental study that involves deprivation. The only pattern ethically open to the investigator is to try to reverse deprivation--i.e., to enrich-- and examine the effects. The earliest important study of this nature was that of Skeels and Dye (1939), the project that became the "sleeper" of its time. Briefly, these authors transferred 13 young children who were showing retarded development in an orphanage to an institution for the mentally retarded. In this new environment, hardly one likely to be thought of as enriching, the infants were cared for by adolescent and young adult mentally retarded girls. Instead of being part of the crowd of infants having to share the scanty amount of adult attention available in the orphanage, the children were suddenly cynosures in a population probably starved for small, dependent creatures in need of love and attention. The story has the happiest of endings. Most of the children, after receiving even this distorted brand of enrichment, soon became adoptable and, when found and studied some 30 years later (Skeels, 1966) were found to have been able to maintain themselves in the community and to have produced offspring that functioned within the normal range. At the time

of this writing, this is the only enrichment study known to this author which has had such an extended follow-up.

Early on the heels of the first speculations about maternal deprivation (at a time when no one would have said anything good about the Skeels and Dye work), Rheingold (1956) carried out an important study aimed at determining whether the amelioration, if not the removal, of psychosocial deprivation would produce favorable developmental consequences. She served as a sort of congregate mother for two sequential groups of four infants residing in an institution and selected eight matched subjects as controls. After two months of her special mothering of them, the infants were examined on certain eye-hand tests selected from the Cattrell Infant Test and on certain aspects of social development. The experimentally mothered infants were found on retest to be more socially responsive, not only to their special caretaker but to other people on the ward as well, and to be slightly though nonsignificantly advanced in postural and motor behavior.

Rheingold and Bayley (1959) re-examined these infants when they were approximately two years old. At this time they could detect no differences between the two groups of babies, either in terms of social behavior or performance on a developmental examination. The authors concluded that, while the early enrichment was enough to produce concurrent changes, it could not sustain them for a prolonged period. To this author, however, the investigators seemed too conservative in their conclusion,

as the enriched babies were found on the follow-up to vocalize more than the control babies. The relationship between early vocalizations and later language is far from understood, but in view of the unyielding consistency with which deprived children are shown to function less adequately in the language area, any type of social experience which is associated with an increase in vocalization is worthy of further study.

There are a few additional experimental studies which might be cited as relevant, but most of them have involved what this author would consider "artificial" enrichment or else have involved such brief follow-up as to make inferences based on them much too hazardous. For example, Casler (1965) has investigated the effects of kinesthetic stimulation on institutional infants prior to adoption; Dennis and Sayegh (1965) tried accelerating fine motor performance with only a two-week experimental period; Ourth and Brown (1961) had mothers provide extra stimulation for their infants during the neonatal period and compared frequency of crying in this group and a routine ward control group; White and Held (1966) reported the consequences for institutional infants of extra handling, motility, and an enriched visual surround. While all such studies are important, they do not give us the kind of hard data needed to understand the effects of "real life" deprivation, or the removal of same, on sustained development. The current enrichment projects involving infant subjects (Gordon, 1967; Caldwell and Richmond, 1968; Painter, 1968; Schaefer, 1968) will in time provide some much needed information about the long-

term effects of enrichment upon the cognitive and socio-emotional development of infants.

Areas of Needed Research

As the literature just cited contains so few studies concerned with the effects of psychosocial deprivation on the human infant that have (a) been prospective, (b) used respectably sized samples, and (c) followed the subjects long enough to permit either cumulative deficit or natural reparative processes to occur, it is obvious that the need for more research dealing with any facet of the problem is acute. Even so, there are priorities which could be established which should lead to greater and perhaps more immediate returns. A few tasks which should receive massive research efforts will be discussed here.

1. Improved techniques of assessing the psychosocial environment. Behavioral scientists have tended to concentrate on measuring and quantifying behavioral outputs, while paying little attention to the environments in which the behavior occurred---all the while passionately espousing convictions about the importance of environmental influences for understanding the developmental phenomena being measured. This relative imbalance needs to be corrected by research concerned with identification of the elements of experience which can influence development and to studies of their incidence and distribution in populations known to contain all levels of the dependent variable under scrutiny. Such a recommendation does not contradict the point made earlier about trying to avoid

possible contamination of the measure of deprivation with knowledge about the dependent variable. Rather, in the first stage of exploration of the variables that are presumed to co-vary, there is a need for diversity of both in order to make certain that there will be enough range to permit a relationship to appear should one exist.

The author and her colleagues have devoted considerable time to the development of a procedure for assessing the specifics of the daily home environment of infants. On the basis of the literature dealing with patterns of family functioning in homes offering contrasting arrays of resources (as summarized by Chilman, 1966), an inventory was developed to provide an index of the level of stimulation and support offered a child in his home. The inventory is scored on the basis of a home visit during which careful attention is paid to the specific ways that the mother handles her child during the observation. The physical aspects of the child's environment are also noted, and information is secured about the breadth of home experiences available to the child. A majority of the items relate to the specific transactions that occur between parent and child during the visit. Such a procedure is undoubtedly insensitive in comparison to detailed anthropological studies of the home environment but is probably better than a compilation of demographic characteristics on the basis of which a family is or is not designated as deprived. Such a gross classification is perhaps tantamount to dichotomizing persons as "normal" or "retarded" on the basis of the criterion of school achievement

For some purposes these gross classifications are adequate--e.g., knowing how many families need vocational training programs or better housing, or knowing how many children need remedial educational work--but when one is seeking to establish relationships between these two variables, the likelihood of obtaining significant associations is greatly enhanced by refining both classes of variables.

The procedure (Caldwell, Heider, and Kaplan, 1966) developed for assessing the qualities of each home has been labeled the Inventory of Home Stimulation. Early standardization data have demonstrated a wide range of variability on the Inventory in families in which variation can be expected in certain key developmental variables in the children. While lower class and middle class families obtain significantly different mean scores, as would be predicted, a much greater range of scores was found for lower class than for middle class families. This confirms the suspicion of many people that in some families, ostensibly quite deprived in tangible and material assets, child care patterns are such that the impact of the material deprivation may well be minimized. The author would hypothesize that it is children from such families who attenuate apparent relationships between deprivation and mental development (or educability, achievement motivation, etc.): such families can easily be identified by a more sensitive measure of the developmental environment.

2. Change-sensitive measures of early child development. Another important need, if the concept of deprivation is to be strengthened as a

useful scientific construct, is more attention to the development of change-sensitive measures of human behavior. The legitimate concern for stability in measuring instruments (e.g., test-retest reliability, etc.) has led to a minimization of effort to develop significant measures which are exquisitely sensitive to a change in the environmental situation. There are those who would argue that one need look no further than to the existing developmental tests, which are perhaps more prone to fluctuate than most test constructors would desire! Yet instruments that rely on ratio estimates of developmental level do not qualify for a truly change-sensitive measure. Preferably here would be naturalistic observation techniques which perhaps involve nothing more quantitative than a frequency count. The work of those who use operant procedures to induce behavioral change (see Bijou and Baer, 1961) exemplifies maximum utilization of change-sensitive behavioral measures. In this work the experimental paradigm involves the deliberate selection of a variable which is expected to change when maintaining or reinforcing condition change. The procedure employed by Harris, Wolf, and Baer (1963) will serve as an illustration even though it did not involve infants. In a series of studies carried out with nursery school children, they followed a standard format: (1) obtained a base frequency of the behavior either to be maximized or extinguished (e.g., non-social play, or crying); (2) instituted a systematic program of differential attention to the child contingent upon his behavior (e.g., attended to child in-

volved in group play; ignored crying child) and obtained measures of output; (3) reversed the pattern of differential attention (ignored group play, or attended to child when he was crying) to make certain that any obtained changes in output were not simply coincidental; and (4) again offered differential attention as in (2) and determined change in frequency of response. Frequency of emission of a large variety of behaviors has been shown to change significantly when the environmental conditions (usually adult attention or some other form of social reinforcement) which shape or maintain the responses are changed. This model has been successfully used in several studies of infant behavior--eliciting and extinguishing smiling (Brackbill, 1958), and head turning (Papousek, 1961)

The focus of much of the work in this area has not been environmental deprivation per se but rather on demonstration of the dependence of certain types of behavioral output upon specifiable environmental conditions. However, only by the careful delineation of response measures which can change is it possible to demonstrate the capacity of the environment to foster and maintain behavior change. These demonstrations have been quite persuasive, and there is now a need to develop additional change sensitive measures for infants other than simple frequency of response emission.

3. Exploring the relationship between constitutional factors and the susceptibility to the influence of deprivation. In an earlier paper, (Caldwell, 1964), this author discussed the need to consider the inherent

characteristics of the children exposed to different types of early experience when looking for evidence of environmental influence. This, of course, is but a reiteration of the position taken by Thomas, Chess, and Birch (1963) and others who have stressed the importance of constitutional factors as buffers against the vagaries of experience.

To illustrate the validity of the point in this context, data from a study by Schaffer (1966) will be cited. In a group of infants ranging in age from one to 29 weeks of age at admission to a hospital for a variety of illnesses, hospitalized at least seven weeks, and medically adjudged to be completely recovered at time of discharge, variability of individual response to the separation (described by Schaffer as depriving) was evaluated as well as the group response. The mean developmental quotient of the infants at the end of hospitalization was approximately 85, but it rose to 95 within 18 days after the return home and showed no further rise after three months. Schaffer interpreted this as indicating that the quotients had returned to their predeprivation levels. The range of individual post-hospitalization changes was from -6 to +31 points. When these changes were related to ratings of activity level made on the infants while in the hospital, it was found that the infants showed the greatest rise (i.e., those who had presumably shown the sharpest drop in the hospital) were those who had been least active during their hospitalization. The two infants given ratings indicating high activity level had both shown a slight decline in test score.

Schaffer suggests that DQ rise following alleviation of deprivation may serve as an indicator of vulnerability to deprivation and that indicators such as activity level during deprivation may give some indication of potential resistance to environmental stress. Inactive infants would certainly resemble the fragile ones described by Spitz (1945) as marasmic. Other studies taking into consideration these constitutional factors are very much needed.

4. Research utilization of the clinical single-case model. Although the author does not wish to belabor the nutrition comparison made earlier in this paper, and certainly not to imply that measurement in the two domains bears much resemblance to one another, the task of providing proof of effect of malnutrition and of psychosocial deprivation is similar. In cases of suspected malnutrition, investigators have often had to rely on evidence from the dependent variable to infer the magnitude of the independent variable--i.e., to infer nutritional status from growth for age--in that only after children are found to deviate from growth norms do they come to the attention of persons who can hopefully offer any remediation. But, of course, discovery of height-weight deviation does not always herald malnutrition, as the infant may be simply manifesting a genetic potential for small stature. A careful inquiry to clarify the etiology may confirm the malnutrition, and immediate clinical action will likely be taken to rectify the inadequate nutrition. In the logic of diagnostic procedure, however, subsequent

measures of height and weight which indicate movement toward growth norms are not proof of the accuracy of the diagnosis. Equally necessary is a check to determine whether food intake has actually changed during the interim in the direction that had been prescribed.

In cases of suspected psychosocial deprivation observed clinically, this same model has generally been followed, but often only part way. For one thing, similar evidence--deviation of developmental rate for age norms in the absence of evidence pointing to biological causation--is often the first indication that psychosocial stimulation might be inadequate to pace normal growth. (It is the <u>first</u> indication only in the same way that appearance of a malnourished child at a clinic forces recognition that the food supply of a population is inadequate.All sorts of other signs are usually clamoring to be perceived, but until there is clinical concern it is usually easy to overlook them.) In the second place, attempts to alter the level of psychosocial input offer about the only reasonable hope of remediation available; if the deviation is due to genetic causes there is little that can be done.

Here the similarity between the two types of clinical decisions usually breaks down, for it is much easier to specify the minimum daily requirements of nutrition than it is of experience. Even so, remediation-as-proof is still justified, provided one does not short circuit the procedure necessary for establishment of full proof of effect. There is no question but that attempted remediation of the deficiencies of the

psychosocial environment should begin almost immediately, as all the evidence available suggests that the longer the delay the less hope one have for complete remediation. However, immediate remediation without careful assessment of the environment in which the child is developing deprives a given clinical case of its opportunity to contribute to the needed foundation of evidence in this area. Only the full chain--deviant development → evidence of deprivation → alteration of psychosocial environment → change in developmental rate → evidence of change of level of psychosocial stimulation--can offer the needed proof of the effects of the environment on the infant's development.

This single case model, essentially the same as that described earlier and associated with the behavior modification group, has important implications for clinical studies of the effects of psychosocial deprivation. Such clinical appraisals followed by remediation can do almost as much to buttress our knowledge of the consequences of psychosocial deprivation as the needed epidemiological, normative, and experimental studies.

Epilogue

This paper has attempted to highlight certain procedures which must be followed if acceptable scientific proof of the power of psychosocial deprivation to distort a child's development is to be obtained. As an epilogue one brief note of caution should be added. That is, concerned people tend to pair the word "deprivation" almost automatically with the

word "enrichment." The above cited studies using the experimental method--all of which involved enriching rather than depriving--reveal that the author tends to think in the same way. But enrichment is not necessarily the antonym of deprivation. Manipulations of experience may be useful only up to an as yet undetermined safety level. To try to go beyond this level in our fervor to counteract deprivation may be like giving vitamins to a well-fed child--his system will just disregard the excess. However, it may possibly be like overloading the small world of a premature baby with too much oxygen and thus forever damaging the cells of his retina. This is not to suggest that some kind of experiential hyperplasis will inevitably occur following psychosocial enrichment, but rather to serve as a reminder of the possibility that it could occur.

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Footnotes

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